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(54) Title: **SYSTEM AND METHOD FOR CASINO MANAGEMENT**

(57) Abstract: A casino resort management system collects patron data, manages patron data in a high performance data warehouse, shares patron data with other systems and reports vital patron information. The system particularly tracks machine history, including changes in location, configuration and performance, and tracks the location history, including game type and denomination, and allows for placards to be moved from one gaming machine to another without losing historical machine or location information. In addition, the system provides two particularly useful graphical displays that simplify visual analysis of the large amounts of data within a casino. One display method depicts tables of thin bar graphs that compactly allow side-by-side comparison of different groupings of machines and another display method depicts machines in three dimensions so that each dimension can provide visual information to a viewer.

SYSTEM AND METHOD FOR CASINO MANAGEMENT

Related Applications

The present application claims the benefit of the following provisional patent application, which is hereby incorporated by reference in their entirety: U.S. Application Serial No. 60/241,326 entitled CASINO RESORT MANAGEMENT SYSTEM, filed on October 18, 2000 by David Keith Howington.

Field Of the Invention

The present invention relates generally to casino resort management systems, and more particularly, to evaluating and improving gaming machine performance.

Background of the Invention

Conventional casino resort management systems keep performance statistics on gaming machines. Casinos for instance, for regulatory and revenue generating reasons, keep statistics on how particular machines perform and how different locations in a casino affect performance of gaming machines. For example, gaming machines are typically programmed to have a particular hold percentage (e.g., the percentage of patron money that will be kept by the machine). The hold percentage generally varies, though and may range from 0-20%. Machines having hold percentages that vary significantly from a regulated required rate may get a resort in trouble with a gaming board or other regulatory authority, and therefore tracking is critical for that reason alone. Also, some locations in a casino may generate better performance than other locations. For example, machines located near areas where patrons tend to congregate, such as food or drink bars, may experience heavier traffic than machines located in more obscure places within the resort. Using this

information, a casino can better make decisions relating to gaming machine density and placement. Information gathered by resorts may also be used to determine the effect of other factors in a casino on gaming machine performance. For instance, it may be determined that persons standing in line near a narrow restaurant door entrance may tend to use proximately located machines more so than individuals who do not have to wait in line to enter an open area food location.

There are known gaming machine performance tracking methods using placards attached to the machines. A placard may indicate the machine brand, model and the denominations that a machine accepts (i.e., quarters or nickels). Each placard generally also has a unique identifier. Where placards are used with machines on a one-to-one basis, there is generally no problem identifying stationary gaming machines within a resort and tracking and analyzing performance information related to the machines. Tracking of gaming machine performance, however, is problematic where placards are moved from one gaming machine to another or where gaming machines are moved from one location to another. In conventional systems, if a placard is moved from a first gaming machine to another, then all information relating to the first machine can no longer be tracked using the original placard number. Similarly, if a gaming machine is moved from one location in a resort to another location in a resort and replacement of placards is a standard practice, then there is no way to track and to evaluate the performance of particular gaming machines in particular locations.

There is not now known a resort management system that accurately, automatically and efficiently provides for tracking and analysis of gaming machine performance

correlated with resort location. In present systems, where gaming machines are identified using placards that may be moved to other machines periodically and where machines that are relocated periodically, such tracking and analysis is arduous at best. A system encompassing features that allow tracking and evaluation of gaming machine performance correlated with location, independent of placard identifiers and notwithstanding that such placards may be removed, is highly desirable. Accordingly, there is a need in the art for a system that can track gaming machine history, including changes in location, configuration and performance; tracks location history including game type and denomination, that tags construction activity in a casino zone; and which allows for the changing of placards infinitely without losing historical machine or location information.

SUMMARY OF THE INVENTION

The present invention provides for a casino resort management system that accomplishes the aforementioned desirable goals and overcomes the deficiencies in the prior art using and providing a location identifier for each location within a casino resort, a placard identifier for each placard, and a machine identifier for each gaming machine all in order to provide for more efficient and accurate tracking and evaluation of machine performance.

To accomplish these and other objects, in one aspect, the present invention comprises collecting patron data throughout a resort using patron club cards, direct mail coupons, and various other methods.

In another aspect the present invention comprises managing patron data in a high performance data warehouse.

In another aspect the present invention comprises sharing patron data with other systems.

In yet another aspect the present invention comprises reporting vital patron information throughout an organization.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements and in which:

FIG. 1 illustrates an exemplary machine location identifier according to an embodiment of the present invention.

FIG. 2 illustrates an exemplary placard identifier according to an embodiment of the present invention.

FIG. 3 illustrates an exemplary machine identifier according to an embodiment of the present invention.

FIGS. 4-6 illustrate exemplary interface display screens for viewing and querying historical records associated with casino machines in accordance with an embodiment of the present invention.

FIGS. 7 and 8 illustrate exemplary thin bar graphs for visually displaying a multitude of machine information according to an embodiment of the present invention.

FIG. 9 illustrates an exemplary arrangement of a casino management system in accordance with an embodiment of the present invention.

FIGS. 10-12 illustrate exemplary casino floorlayout for visually displaying a multitude of machine information in a single display screen.

DETAILED DESCRIPTION

The present invention includes a system for tracking machine history, including changes in location, configuration and performance; for tracking location history, including game type, denomination, and for tagging construction activity in a casino location; and for changing machine placards without losing historical machine or location information.

The system of certain embodiments of the present invention includes the collection of patron data throughout a resort, or multiple resorts, using patron club cards, direct mail coupons, and various other methods. In these embodiments, the system manages patron data in a high performance data warehouse and shares patron data with other systems. The system also reports vital patron information throughout an organization to system operators and to other individuals having a need to evaluate and track machine and location performance.

Particularly, the tracking and management system of the present invention tracks and manages casino action including machine history, location history, and tracks historical machine and/or location information notwithstanding that machine placards may have been substituted and placed with other machines or that machines have been moved to various other locations within a resort.

The present invention also tracks and manages patron club information. Patron club information, for example, may include spending and purchasing information about members in a club sponsored by a particular resort. In such clubs, it is typical that

members may accumulate points and/or comps depending upon one or more factors including frequency of visits, gaming machine patronage, cumulative amounts spent and the like. The present invention tracks and manages such information associated with patron club members. The tracking and management system can also track patron club member preferences, including personal, family and group preference information. Patron information includes a wide variety of data including tracking patrons throughout the casino and any attached resort attractions, tracking gaming, credit restaurant, recreational and retail transactions, tracking activity of the patron's spouse and children, tracking promotional offerings and redemption by patrons, placing restrictions on a patron's club card, recording patron's preferences such as language, cocktail, restaurant, etc., establish patron's club levels, generate effective targeted marketing, evaluate groups or junkets according to profitability, score trip or history performance between different junkets, share, earn and redeem points between multiple casinos, and redeem rewards and/or comps at retail or resort locations.

Knowledge and analysis concerning such data is obviously desirable for club member and non-club member patrons for targeted marketing efforts and for improving customer service. For this reason, the system of the present invention also tracks and manages data related to patron hotel transactions and preferences; restaurant purchases, point and comp redemption; retail purchases; and information relating to recreational activities that patrons undertake, such as golf outings, spas, movies and the like.

Returning to gaming equipment and its tracking, FIG. 1 illustrates an example of a location identifier within a casino. The location identifier identifies a machine location throughout a property. In a preferred embodiment, as shown in FIG. 1, the location

identifier comprises a 14-digit alphanumeric identifier – CAS.DUN.4.1.14 that includes up to five hierarchical levels of identification. In particular, the first level “CAS” can refer to a particular establishment such as the Castle Casino; while the second level identifier “DUN” refers to a particular room, or sub-part, of the casino such as the Dungeon Room. Within this room, the equipment can be identified by its “zone” (i.e., 4) and its “row” (i.e., 1). An additional level of identification, the “seat” (i.e., 14), can be included to further pinpoint the machine location. The exemplary location identifier illustrated in FIG. 1 utilizes “periods” as separators between identification levels. Other separators, no separators, fixed field lengths for each level are some alternative formats also contemplated within the scope of the present invention and, further may be user defined or defined in accordance with a proprietary standard.

In certain embodiments, the location identifier can be printed on a variety of media and attached to a machine so that casino personnel can visually determine the identifier, bar scan the identifier, or otherwise obtain the location identifier from the machine. The location identifier can also be stored electronically within electronics of the machine or as an add-on memory device. With such electronic storage, the machine can transmit the location identifier to other electronic devices, such as a central management system that queries the machine, via local infrared, or wired, communications methods as well as by remote wireless or wired network communications.

FIG. 2 is an example of a placard identifier useful in embodiments of the present invention. These embodiments include placard identifiers that identify particular placards placed on gaming machines. These exemplary placards are movable from one gaming machine to another without a concurrent loss of location or machine information, because

each machine also has a machine identifier described below. In an embodiment, the placard identifier includes a 6-digit numeric identifier, including one level of identification and the placard identifier is user definable or may be defined according to a proprietary standard. In FIG. 2, the placard number "042052" is used to denote a machine code "04" that, for example, indicates a quarter slot machine and a machine number "2052" that simply identifies a machine within this particular denomination. Similar to the location identifier, the placard identifier can be associated with a particular machine both electronically or visually and support a variety of methods for sharing the placard information with other devices.

FIG. 3 depicts an exemplary machine identifier. Embodiments of the present invention include a machine identifier, which is a unique number provided for every gaming machine. Each remote gaming machine is capable of transmitting its unique machine identifier to a central management host when prompted or in a proactive fashion such as when an alarm or alert is initiated. In one embodiment, the machine identifier comprises an 8-digit alphanumeric identifier, where the first three alpha digits (IGT) are reserved for a manufacturer code and the last five-numeric digits (00001) are sequentially auto generated. The machine identifier may be user defined or defined according to a proprietary standard.

The system of the present invention maintains and tracks machine and location history in a manner which allows for the changing of machine placards without losing historical machine or location information. Within this system, data relating to the machines within a casino, their changing locations within the casino, and their performance are stored in a database that permits querying, sorting and analyzing the historical machine

data form a variety of perspectives. This database of information can be accumulated via manual data entry as machines and placards are moved throughout a casino or the database can be populated automatically by electronically querying one or more of the casino's machines for their identity, placard information and location identifier. One alternative embodiment includes electronic querying of one or more PDAs that are used by casino personnel to acquire and aggregate information from a number of different machines and then populating the database via the information in a PDA.

FIG. 4 is a sample system display 400, according to an embodiment of the present invention, illustrating a graphical interface for viewing, querying and retrieving placard changes and location changes for various machines. The display 400 provides a sub-window 402 that includes a listing of gaming machines by row with corresponding columns for location identifier, placard identifier, machine identifier, denomination, machine type, machine model, the par or hold percentage, and act percentage. A pop-up screen indicates which machine (ari00004) is highlighted. The organizational menu 404 allows a user to refine the interaction with the database, for example, by providing a query window, sorting by particular fields, and limiting the time-frame of interest.

Thus, the interface of FIG. 4 allows searches to be conducted by machine ID, placard ID or location ID. Queries of various types may also be formulated such as a query to find all machines having a particular denomination or being of a particular type. Historical information may be displayed by year, quarter, month, week or day. New information concerning machines may be added and machine information may be modified on this screen by a system operator.

In addition to the information displayed in sub-window 402, the bottom region 408 of the display 400 provides separate sub-windows 410 and 412 that detail location and placard histories, respectively, for the highlighted machine. Regarding location, the date and time of machine changes are provided in one column along with the placard identifier, the machine identifier, and revision dates. Regarding the highlighted placard identifier, columns are provided for the date and time of any placard changes for a particular machine, the location identifier, machine identifier, and revision date changes. Regarding the machine identifier, as shown in sub-window 414, columns are provided for the date and time of any change in location, the location identifier, the placard identifier and any revision date changes. In sub-window 416, regarding revisions, columns are set up for the date and time of any revisions, the reason for revisions, the par percentage for the highlighted machine, and a description column providing additional information regarding the machines. FIG.4 is merely an exemplary interface and other, interfaces and screen layouts that provide similar functionality are contemplated within the scope of the present invention.

The exemplary display screen 500 of FIG. 5, provides information on machine performance as opposed to machine, location, placard and revision history. For the particular highlighted machine (ari00004), the display in FIG. 5 includes columns for the period, the coin in amount, the daily average for the coin in amount, the win/loss amount, and the daily average for the win/loss amount. These exemplary data fields are pertinent to slot machines; however, the present invention also contemplates maintaining historical information on other performance-related fields that may be appropriate for other types of machines managed by the casino. The performance data can be obtained by the

management database through either manual data-entry or electronic communication between each machine and a centrally located server.

FIG. 6 contains similar location, placard, and machine information as FIGS. 4 and 5, except that FIG. 6 also includes information relating to wins, recorded currency amounts, and counts for the particular machine (ari00004) that is currently highlighted.

Using the exemplary interfaces depicted in FIGS. 4-6, casino resort management can use embodiments of the present invention to track and evaluate machine performance and location performance simultaneously. A system operator can use the information provided in the database, through the exemplary interface screens, to note, for example, that a particular location in the resort is slow and not attracting much action with the games currently in that location. Hot machines in other locations can be readily identified (by querying and sorting via the appropriate performance data) and then swapped into the slow location to improve action there. After the switch is made, the system operator can easily monitor the slow location to determine if action in the slow location has improved and by how much. By rotating other machines into the same location, the displayed information can also be used to determine which machines provide the greatest impact on the location.

The tracking features of the present invention are particularly useful where machines have been moved into hot and cold locations over a period of time. Because embodiments of the present invention allow for tracking on a machine/location basis, it is relatively easy to determine and compare the machine performance based on location. Even if placards on various machines have been replaced, the machine performance history and location history are preserved. The database of information simultaneously provides tracking information regarding revisions to machine locations, placard identifiers, and

associated machines and provides vital information for decision-making to the casino. Revisions may include, but are not limited to, information regarding gaming machine moves, glass changes, software changes, peripheral additions and changes, location in/out of service information, game in/out of service information, maintenance information and alarms.

As mentioned earlier, many casinos also employ data gathering techniques (e.g., magnetic swipe cards at each machine) for identifying a patron and associated personal information, the patron's location within the casino, that patron's wagering characteristics, that patron's affiliation with other groups or patrons, promotional items or comps related to the patron, and that patron's other activities related to arriving at, enjoying and departing from the casino. Embodiments of the present invention contemplate sharing of the patron related information with the machine management database information described earlier. The sharing of this information allows scores for and evaluations of games and players. Game and player-related relationships may also be compared on any basis such as game type, denomination, location, group, age, sex, status, and club level. Additionally, virtually any relationship comparison may be reviewed and reported using the system of the present invention making evaluation of such data simpler and faster than traditional methods.

In addition to the previously mentioned benefits provided by various embodiments of the present invention, using the performance tracking features of the invention, cool performing machines can be compared to other machines of the same type, in the same zone or location, and problems and maintenance issues can be easily identified. Comparison of patrons can also be made over user defined periods (such as 30, 60 and 90 day periods), hot machines can be identified quickly and compared against other machines,

and poor performing games can be identified along with questionable players. Indices can also be compared by seat, row, zone, or by virtually any selectable parameter related to a resort. The present invention also has case and set management features which allow for identification of under performance issues so that they may be addressed in a timely and efficient manner. The case management system allows for evaluation of "out of parameter" games, patrons, and/or groups that are under performing. The set management system allows for collection and evaluation of cases that meet certain criteria for evaluation.

FIG. 7 depicts an exemplary screen 700 for displaying the large amounts of data available to a system operator. In particular, FIG. 7 illustrates a visual analysis display tool presenting machine performance information as thin bar graphs in a data table. Because any given resort may have thousands of machines, it is virtually impossible for a system operator to view performance for more than a few machines on a typical display screen. Machine performance patterns may therefore go undetected. The exemplary data visualization display of FIG. 7 utilizes a thin bar graph format, allowing a system operator to simultaneously visually analyze performance and other data for potentially thousands of machines on one display screen. The display table 702 includes columns for placard identification 704, manufacturer 706, denomination 708, average daily wins 710, total wins 712, and coin in 714. Also, moving the cursor to any location on the bar graphs displays 716 information concerning a particular machine such as the location placard, machine revision and denomination information for a particular machine, and the machine history, par percentage, model, type, on-board and any additional information.

FIG. 8 is another example of a display showing the visual analysis capability of an embodiment of the present invention. Particularly, FIG. 8 demonstrates the sortability and relational features of the visual analysis in presenting comparisons between machines regarding performance, manufacturer, denomination, average daily win, total win and coin in. For example, by viewing the average daily win column, a casino operator can easily determine (from the shape of A vs. B) the relative weakness of the machines B of one manufacturer as compared to machines A of a second manufacturer in Figure 8.

FIG. 9 depicts a block diagram of an exemplary casino management system. A management server 902 comprises one or more computing hosts that can be located locally or remotely to a casino resort. One management server 902 can be provisioned for each casino or for multiple casinos. Casino personnel interact with the management server 902 via the operator interface 904 that can run on wireless or wired computers, laptops or PDAs that can be remotely or locally located. This interface 904 provides the exemplary displays of FIGS. 4-8 as well as permits operators to enter, edit and delete data from the server 902. The interface 904 can include means for connecting PDAs or other data collection devices in order to acquire data collected from remote machines that do not communicate directly to the server 902. The management server 902 also communicates with data warehouses that store patron related data 908 and machine location and performance data 906. These databases can be remotely or locally located and can be a single warehouse or disjoint databases. Within the casino, apparatuses are used at gaming stations, ticket windows, funds cages and other attractions to collect data about patrons 910 and to collect data about the gaming machines 912. These data collection devices and gaming machines (910 and 912) can be networked together and communicate with the management server 902 by

either polling methods or by self-initiated communication. Alternatively, data collection devices can collect and store data and then download the collected data to an operator's PDA which is periodically used to acquire the collected data throughout a casino.

One additional benefit of the present inventive system is that the casino layout can be modeled graphically so that the machine location and performance can be presented more visually. In such an arrangement, a casino layout, or 3D virtual world, is created and stored (e.g., 934) for use by the server 902. In this environment, an operator can visually locate a location in the casino by selecting that location from the visual display and view the performance of the machine, or machines, at that location.

In particular, aspects of the present invention relate to techniques for visually displaying data about the machines in a casino. FIG. 10 illustrates an overhead view of machines on the casino floor. In other embodiments of the present invention, this display could also depict other type of games and gaming tables. The external database 934 can store information about each of the different floor locations in the casino. For example, each bank 1010 of machines can have stored data associated therewith which identifies the "orientation" of the bank. This "orientation" indicates the angle of the bank 1010 in relation to some reference point (e.g., magnetic north).

When a machine is located or moved within the casino, its new location is reported to the management system. Using the stored information about the different banks 1010, the machine can be automatically depicted on the display 1000 in its appropriate location and orientation without requiring an explicit floorplan to be pre-created for the casino floor. Also included in the display 1000 are user selectable settings that can control the features displayed. In particular, setting 1002 (or clicking on the view) allows a zoom

factor to be set; setting 1004 determines the perspective of the displayed view; setting 1006 selects the type of machines depicted in screen 1000; and setting 1008 determines by what criteria the machines are displayed.

For example, in the display 1000 of FIG. 10, "performance" has been chosen. Performance is a metric that can be identified and set by the user to mean "total coin in", "profitability", "average daily win", etc. Embodiments of the present inventive system provide the user a list of conventional performance measures and permit the user to select what definition of performance to use. This definition selection is modifiable and is not a hard-coded aspect of the system. Although FIG. 10 is in black and white, the individual squares (i.e., machines) are different colors depending on their performance. The colors that are associated with a different performance ranges are settable by the user from a palette screen so that a user can customize the display or use a default color setting.

In FIG. 10, there is also a window 1020 that displays machine information about the machine which the cursor is floating over; the machine information in the window 1020 is updated as the cursor moves. One alternative might be to require the user to click on a machine to update the window 1020. The machine (i.e., placard 3185) on the display 1000 can also be caused to blink so that the user knows which machine is being displayed in window 1020. This is helpful because the cursor may span more than one machine and the machine closest to the cursor's tip is the one which updates the window 1020.

If the machine in window 1020 is being played by a patron using a magnetic card, then patron information can be displayed in window 1024. From the database 934, a picture of the patron can also be retrieved and displayed to help casino personnel identify players on the floor.

The database 934 can include patron information that identifies a player who is considered a "hot player", that is, a patron whom the casino wants to make sure has an enjoyable time. Thus, the focus of display 1000 can move automatically in a sequence between machines which are being played by hot players. In this manner, the view continually updates statistics about those "hot players" without requiring the user of the system to manually move the cursor. As a new "hot player" starts playing, the focus of the display 1000 can move to the new machine and then return to its automatic sequence after a predetermined time period.

The display of FIG. 10 is only two dimensional and provides limited information to a viewer. FIGS. 11 and 12 show two possible three dimensional views of the casino floor. In FIG. 11, the display 1100 has been set via settings 1004 and 1008 to display a medium angle view according to "Combo1". In this display each machine is represented by a three-dimensional icon, for example a rectangular column 1102, in which there are three visual cues to convey information. The column's top color is one visual cue, the column's side color (any visible side) is another visual cue, and the height of the column is another visual cue. In an exemplary embodiment, the top color is associated with the machine's manufacturer, the side color is associated with the machine's denomination, and the height is associate with performance.

The system allows a user to set the colors for each visual cue. For example, the system can provide a list of all the different machine manufacturers and a palette of different colors. The user then associates a manufacturer (e.g., Aristocrat, IGT, etc.) with a color. The same type of operation can be performed in associating a color with each

machine denomination (e.g., nickel, quarter, etc). Thus, the display 1100 displays three data points -- manufacturer, denomination, and performance -- in three dimensions.

FIG. 12 depicts a low angle view of alarm conditions. Again, a user is presented with a window that lists the various alarms and is permitted to associate a color with each alarm. In this example display 1200, the side of the column 1202 is associated with the general type of alarm (e.g., mechanical, electronic, customer service, etc.) and the top color is associated with the specific alarm (e.g., coin jam, hopper empty, etc.). In this embodiment, the height of the column indicates the age of the alarm, with the higher column indicating an older alarm. Accordingly, a user can quickly view the alarms currently active and prioritize them according to severity as well as age.

The difference in viewing angles helps exaggerate certain aspects of the three dimensional view. For example, the low angle view of the alarm screen in FIG. 12 allows the height and side color to predominate. The medium view of FIG. 11 allows both the side color and top color to be equally viewable while a high angle view (not shown) would allow the top color to predominate and make differences in column height less discernable, but still visible. This functionality accents desired aspects of the data to increase its speed of recognition, and therefore adds value in its presentation to the user.

The exemplary screens of FIG. 10-12 are meant as examples only and are not meant to limit any embodiment of the present invention to only the specific screens illustrated. One of ordinary skill would easily recognize that the underlying visual display methods described herein can be used to simultaneously visualize any three data characteristics associated with a machine on the casino floor.

The casino management system architecture and methods herein described include a number of additional benefits and features that simplify and automate management and tracking of machine and patron data for a casino.

In particular, the interface provided by the management server 902 to a casino operator includes context sensitive help information. Similar to the pop-up windows available on many web pages, an operator can "mouse-over" a field on the interface of FIG. 4, for example, to reveal explanatory information about that field. This "help" information as well as the field names and identifiers can support multiple languages which can be selected and changed by an operator.

One particular benefit of the present inventive system is that the burden of daily record keeping and accounting required of casinos can be significantly reduced. For example, tracking slot machine "jackpots" and "fills" can be easily accomplished. In one example, a casino employee can arrive at a machine, swipe an ID card through a PDA, scan one or more machine identifiers (e.g., placard) using the PDA, enter the transaction amount and type (i.e., jackpot or fill), and eventually download the data to a central repository.

Workorders and other maintenance activity can also be automated. In response to a machine alarm, or other more-traditional indicator, a maintenance personnel can be dispatched to a machine, swipe an ID card through a PDA, scan a machine identifier, identify and record a maintenance activity (which can even include removing parts from inventory), and provide this historical maintenance data as requested.

Because of the communications capabilities of the various machines, the machines can determine and announce, themselves or through the server 902, a "jackpot" or "fill" condition. In response, a page, e-mail or other electronic notification is generated to

dispatch personnel and the type and timing of the response is tracked. Activity response times can be monitored so that uncompleted tasks can be identified and escalated to produce additional dispatch messages. The server 902 can maintain and store 932 work schedules and work assignments in order to automatically determine which personnel to dispatch according to the appropriate machine's location.

In certain embodiments of the present invention, the central data collection features and the networked communication (e.g., 934) of the casino machines and the server 902 results in additional benefits. For example, playing different machines and partaking of the resort attractions can be accomplished using magnetic cards (similar to using a credit card to pay-at-the-pump) instead of traditional currency and coin methods. Within this embodiment of the present invention, funds for a particular patron can be electronically identified and transferred to the casino. As the patron enjoys the casino's attractions using a magnetic, or other smart technology, card, the funds associated with that patron is adjusted positively and negatively, and eventually the patron can cash-out at a casino cage.

In one exemplary embodiment, the magnetic cards are called "GO-CARDS" and permits anonymous, cashless paying at a casino. According to this embodiment, patrons

pick up a GO-CARD;

place the GO-CARD in a electronic funds transfer machine or charging station;

(if necessary) place money in the charging station;

play each machine having a card reader in the casino without cash with credits being accumulated or depleted;

at each machine, press the cash-out button and all remaining credits are stored on the GO-CARD;

move to other machines;

cash-out at the casino cage or an automated GO-CARD cash-out station.

In other embodiments, the GO-CARDS have one or more of the following features:

pin numbers for added security against loss;

limited amount of downloadable credits;

limited balances which can accumulate;

using paper receipts from each machine for lost card security;

marketing promotion which can "charge-up" player club cards and players redeem direct mail free-play offers right at the machine, eliminating the need to go to the cage, and eliminating coupons or tickets;

restricting promotional credits to play only.

Furthermore, cashless ticket accounting can be implemented at the casino to complete, issue, track, verify and pay-out tickets right at the game or at a casino cage.

In the foregoing specification, the invention has been described with reference to specific embodiments thereof. It will however be evident that various modifications and changes may be made thereto without departing from the broader spirit and scope of the invention. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

1. A casino management method comprising the steps of:
 - collecting patron data, for each of a plurality of patrons, throughout a casino using respective patron cards;
 - storing said patron data in a data warehouse;
 - 5 analyzing said patron data; and
 - determining one or more incentives for each of the plurality of patrons based on the analysis of said patron data.
2. The method according to claim 1, wherein the one or more incentives includes at least one of: gaming coupons, discounted airfare, restaurant coupons, discounted fares for activities at a resort affiliated with the casino; and incentives for another casino affiliated with the casino.
- 5 3. The method according to claim 1, wherein the step of collecting patron data is performed by a magnetic card reader located at each of a plurality of games in the casino.
4. A casino management method for tracking and managing data related to operation of a casino including the steps of:
 - tracking and managing gaming activity within a casino;
 - tracking and managing patron data, for each of a plurality of patrons, throughout a
 - 5 casino using respective patron cards, said patron data comprising:
 - (a) club points associated with a particular patron;

- (b) comps associated with the particular patron;
 - (c) preferences associated with the particular patron; and
 - (d) other activity of the particular patron in a resort affiliated with the
- 10 casino,

in response to a query regarding the patron data, generating a report of selected patron data.

5. The method according to claim 4, wherein the preferences include personal preferences, family preferences, and group preferences.

6. The method according to claim 4, wherein the preferences include travel preferences, cocktail preferences, and hotel preferences.

7. A casino management method for tracking history of gaming machines and casino locations, comprising the steps of:

- assigning a respective location identifier to each location within a casino;
- associating a respective machine placard with each machine within the casino;
- 5 associating a respective machine identifier with each machine within the casino;
- tracking within a database a history of the correlation between location, placard and machine identifiers as machines and placards are moved within the casino.

8. The method according to claim 7, further comprising the step of:

generating a report based on the tracked history in the database, the report organized according to any of the location identifier, the placard identifier, and the machine identifier.

5

9. The method according to claim 8, wherein the report simultaneously display historical data organized according location identifier, placard identifier and machine identifier.

10. The method according to claim 7, further comprising the step of:

acquiring respective performance data associated with each machine within the casino.

11. The method according to claim 10, further comprising the step of:

determining and reporting a historical performance of different gaming machines at a particular location in the casino.

12. The method according to claim 11, further comprising the steps of:

organizing locations within a casino into one or more zones; and

determining and reporting a historical performance of a particular zone within the casino.

5

13. The method according to claim 10, further comprising the step of:

determining and reporting a historical performance of a particular gaming machine at different locations in the casino.

14. The method according to claim 10, further comprising the step of:

determining and reporting a historical performance of different machines associated with a particular placard identifier.

15. The method according to claim 10, wherein performance data includes one or more of coin in, jackpot, win/loss, par% and act%.

16. A casino management method that tracks history of a plurality of gaming machines and casino locations, comprising the steps of:

tracking a respective first history of each gaming machine in a casino, each said first history including changes in location of the machine within the casino, changes in

5 machine configuration, and machine performance;

tracking a respective history of each location within a casino, each said second history including a type of game at the location, denomination of the game at the location, and information associated with the location;

exchanging placards among the plurality of gaming machines while maintaining

10 tracking of the first and second histories, said placards comprising a unique placard associated with each of the gaming machines.

17. A casino management method for evaluating machine and location performances, comprising the steps of:

evaluating a first performance of a first gaming machine at a first location;

evaluating a second performance of a second gaming machine at a second location;
5 after relocation of the first gaming machine to the second location, evaluating a
third performance of the first gaming machine at the second location; and
comparing the first performance and the third performance in order to generate
comparative performance data for the first gaming machine according to location within a
casino.

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18. The method according to claim 17, further comprising the steps of:

associating a respective location identifier with each location within the casino;
associating a respective machine identifier with each gaming machine within the
casino; and

5 using the location identifiers and the machine identifiers associated with the first
and second gaming machines and the first and second locations when tracking said first,
second and third performances.

19. A casino management method for evaluating performance of different gaming
machines and locations within a casino, comprising the steps of:

associating a respective location identifier with each of a plurality of locations
within the casino;

5 associating a respective machine identifier with each of a plurality of gaming
machines within the casino;

tracking a relationship between a particular gaming machine and a particular
location based on the location identifiers and the machine identifiers;

- placing a first gaming machine in a plurality of different locations within the
10 casino;
evaluating a respective performance of the first gaming machine at each of the
plurality of different locations; and
locating the first game machine in the casino based on the respective performances.
20. A casino management method for evaluating performance of different gaming
machines and locations within a casino, comprising the steps of:
associating a respective location identifier with each of a plurality of locations
within the casino;
5 associating a respective machine identifier with each of a plurality of gaming
machines within the casino;
tracking a relationship between a particular gaming machine and a particular
location based on the location identifiers and the machine identifiers;
tracking respective additional information about each of different gaming machines
10 at a particular location; and
generating a report providing a comparison of the respective additional information.

21. The method according to claim 20, wherein the respective additional information
relates to revisions of the different gaming machines.

22. The method according to claim 21, wherein revisions include one or more of location
movements, glass changes, software changes, peripheral additions and changes, location

in/out of service changes, gaming machine in/out of service changes, maintenance changes, and alarm conditions.

5

23. The method according to claim 20, wherein the respective additional information relates to gaming machine characteristics and player characteristics.

24. The method according to claim 23, wherein:

gaming machine characteristics includes one or more of game type, game denomination, and game location; and

player characteristics includes one or more of group, age, sex, status and club level.

5

25. The method according to claim 20, wherein the respective additional information relates to different patron playing performance in a predetermined time frame.

26. A casino management method for evaluating performance of different gaming machines and locations within a casino, comprising the steps of:

associating a respective location identifier with each of a plurality of locations within the casino;

5 associating a respective machine identifier with each of a plurality of gaming machines within the casino;

tracking a relationship between a particular gaming machine and a particular location based on the location identifiers and the machine identifiers;

tracking respective additional information about a particular gaming machine at
10 each of different locations; and
generating a report providing a comparison of the respective additional information.

27. The method according to claim 26, wherein the respective additional information
relates to revisions of the different gaming machines.

28. The method according to claim 27, wherein revisions include one or more of location
movements, glass changes, software changes, peripheral additions and changes, location
in/out of service changes, gaming machine in/out of service changes, maintenance changes,
and alarm conditions.

5

29. The method according to claim 26, wherein the respective additional information
relates to gaming machine characteristics and player characteristics.

30. The method according to claim 29, wherein:

gaming machine characteristics includes one or more of game type, game
denomination, and game location; and

player characteristics includes one or more of group, age, sex, status and club level.

5

31. The method according to claim 26, wherein the respective additional information
relates to different patron playing performance in a predetermined time frame.

32. A visual analysis method comprising the steps of:
- acquiring gaming machine data;
 - providing for sorting of the acquired gaming machine data; and
 - presenting the acquired gaming machine data in a table with multiple thin bar
- 5 graphs.
33. The method according to claim 32, wherein the sorted data is presented.
34. The method according to claim 32, wherein the gaming machine data relates to the operating performance of the machine.
35. The method according to claim 32, wherein the step of sorting is performed based on one or more of a placard identifier, a machine identifier, and a location identifier; each of said identifiers associated with a respective one of a plurality of gaming machines in a casino.
- 5
36. The method according to claim 32, wherein the table presents the thin bar graphs allowing side-by-side comparison of a first gaming machine and a second gaming machine.
37. A method of managing a cashless casino, comprising the steps of:
- providing an patron card to a patron of a casino;
 - associating a monetary value with the patron card;

providing a first game at the casino that accepts the patron card and recognizes the
5 associated monetary value to allow a patron to play the game;
adjusting the associated monetary value based on the patrons play of the first game;
and
upon receiving a request by the patron, exchanging the patron card for an amount of
money based on the adjusted associated monetary value.

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38. The method according to claim 37, further comprising the steps of:

receiving cash or cash equivalent from the patron;

determining the associated monetary value based on the received cash.

39. The method according to claim 37, wherein the adjusting step is performed by the first
game.

40. The method according to claim 37, wherein the associated monetary value is stored on
the patron card.

41. The method according to claim 37, wherein the associated monetary value is stored in
a database, said database in communication with the first game and storing an association
between the patron card and the associated monetary value.

42. The method according to claim 37, further comprising the step of:

generating a receipt related to the adjusted associated monetary value.

43. The method according to claim 37, further comprising the steps of:

providing a second game at the casino that accepts the patron card and recognizes the adjusted associated monetary value to allow a patron to play the game;

further adjusting the adjusted associated monetary value based on the patrons play
5 of the second game.

44. A visual analysis method comprising the steps of:

acquiring respective gaming machine data for each of a plurality of gaming machines in a casino, said gaming machine data having at least three separate components;

generating a plurality of three-dimensional icons, each icon corresponding to one of
5 the plurality of gaming machines;

for each particular generated icon:

associating a first component of the corresponding gaming machine data with a first color of a side of the particular icon;

associating a second component of the corresponding gaming machine data
10 with a second color of a top of the particular icon, and

associating a third component of the corresponding gaming machine data with a size of the particular icon, and

simultaneously displaying the plurality of three-dimensional icons such that the respective first, second and third components are visually discernable.
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45. The visual analysis method of claim 44, further comprising the step of:

arranging the display of the plurality of three-dimensional icons to correspond to a physical layout of the plurality of gaming machines within the casino.

46. The visual analysis method of claim 44, wherein the gaming machine data includes performance, denomination, alarm conditions, manufacturer.

47. The visual analysis method of claim 46, wherein alarm conditions include any of an alarm, alarm category, and alarm type.

48. The visual analysis method of claim 44, further comprising the steps of:

associating a respective location identifier with each of a plurality of locations within the casino;

5 associating a respective machine identifier with each of the plurality of gaming machines within the casino;

tracking a relationship between a particular gaming machine and a particular location based on the location identifiers and the machine identifiers.

49. The visual analysis method of claim 48, further comprising the step of:

based on the tracked relationship, arranging the display of the plurality of three-dimensional icons to correspond to a physical layout of the plurality of gaming machines.

50. The visual analysis method of claim 44, further comprising the step of:

adjusting a viewing angle of the display of the plurality of three-dimensional icons
so as to emphasize one of the first, second and third components.

51. The visual analysis method of claim 44, further comprising the steps of:
acquiring respective patron data for one or more of the plurality of gaming
machines; and
in response to one of the displayed three-dimensional icons being selected,
5 displaying the respective patron data.
52. The visual analysis method of claim 51, wherein the patron data includes a picture of
the patron.
53. The visual analysis method of claim 51, further comprising the steps of:
determining from the respective patron data, a set of the displayed three-
dimensional icons, said set of icons corresponding to those gaming machines being played
by a patron matching a predetermined criteria, and
5 automatically displaying, in sequence, the set of icons.
54. The visual analysis method of claim 44, wherein the size of the particular icon is the
height of the particular icon.
55. The visual analysis method of claim 44 further comprising the steps of:
determining from the respective gaming machine data, a set of displayed three-
dimensional icons, said set of icons corresponding to those gaming machines experiencing
an alarm condition, and
5 automatically displaying, in sequence, the set of icons.

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LOCATION IDENTIFIER

CAS. DUN. 4.1.14

FIG. 1

PLACARD IDENTIFIER

0 4 2 0 5 2

FIG. 2

MACHINE IDENTIFIER

I G T 0 0 0 0 1

FIG. 3

SUBSTITUTE SHEET (RULE 26)

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GAMBIT CONFIDENTIAL - Copyright 2000 Gaming Systems International Slot Machine View

GAMBIT Edit Window Help

GSI GAMBIT MystioLAKE

This is where information on machines is added or modified.

Find By: By Machine ID

Query:

Number	Location	Placard	Machine	Denom	Type	Model	Par %	Act %	Days	Machine Description
ARI00004	MYS A.001.17	10983	ARI00004 \$ 5		ARI4PDBOP 9100		10.00	0.00	0	
ARI00005	MYS A.001.18	10982	ARI00005 # 5 MD		ARI4PDBOP 9100		10.00	0.00	0	
ARI00006	MYS A.002.04	10976	ARI00006 # 25		ARI4PDBOP 9100		10.00	0.00	0	
ARI00007	MYS A.002.09	10971	ARI00007 \$ 100		ARI4PDBOP 9100		10.00	0.00	0	
ARI00008	MYS A.002.10	10970	ARI00008 # 5		ARI4PDBOP 9100		10.00	0.00	0	
ARI00009	MYS A.002.11	10969	ARI00009 # 25		ARI4PDBOP 9100		10.00	0.00	0	
ARI00010	MYS A.002.15	10965	ARI00010 # 25		ARI4PDBOP 9100		10.00	0.00	0	
ARI00011	MYS A.002.16	10954	ARI00011 # 25		ARI4PDBOP 9100		10.00	0.00	0	

Time: ☐ Week ☐ Month ☐ Day ☐ Year

Layout: ☐ Performance ☐ Summary

Today: ☐ Monthly Performance ☐ Summary

Game Setup: ☐ History ☐ Drop ☐ Meters ☐ Summary

Period	Coin In	Daily Avg	Win/Loss	Daily Avg
20000824	6,451.00	6,451.00	32,255.00	32,255.00
20000825	8,905.00	8,905.00	44,525.00	44,525.00
20000826	8,364.00	8,364.00	41,820.00	41,820.00
20000827	10,080.00	10,080.00	50,400.00	50,400.00
20000828	8,550.00	8,550.00	42,750.00	42,750.00
20000829	8,685.00	8,685.00	43,425.00	43,425.00
20000830	10,295.00	10,295.00	51,475.00	51,475.00
20000831	8,732.00	8,732.00	43,660.00	43,660.00
20000832	8,219.00	8,219.00	41,095.00	41,095.00
20000833	6,368.00	6,368.00	31,840.00	31,840.00
20000834	7,161.00	7,161.00	35,805.00	35,805.00
20000835	5,954.00	5,954.00	29,770.00	29,770.00
20000836	6,758.00	6,758.00	33,790.00	33,790.00
20000837	9,912.00	9,912.00	49,560.00	49,560.00
20000838	6,360.00	6,360.00	31,800.00	31,800.00
20000839	7,654.00	7,654.00	38,270.00	38,270.00
20000840	7,062.00	7,062.00	35,310.00	35,310.00
20000841	9,628.00	9,628.00	48,140.00	48,140.00
20000842	11,004.00	11,004.00	55,020.00	55,020.00

FIG. 5

SUBSTITUTE SHEET (RULE 26)

GAMBIT CONFIDENTIAL - Copyright 2000 Gaming Systems International Slot Machine View									
GAMBIT Edit Window Help									
This is where information on machines is added or modified.									
GSI GAMBIT MysticLAKE		Slot Acting							
Find By:		By Machine ID		Limit By...		LPM:		Time:	
Query:						✓ Picked		✓ Week	
						✓ Location		✓ Month	
						✓ Machine		✓ Quarter	
								✓ Day	
								✓ Period	
								✓ Year	
								✓ Tracked	

Number	Location	Placard	Machine	Denom	Type	Model	Per %	Act %	Days	Machine Description	
										Par %	Act %
ARI00002	MYS.A.001.13	10987	ARI00002 \$ 25		ARIKPBOP.9100		10.00	0.00	0		
ARI00003	MYS.A.001.14	10986	ARI00003 # 5 MD		ARIKPBOP.9100		10.00	0.00	0		
ARI00004	MYS.A.002.17	10973	ARI00004 # 5		ARIKPBOP.9100		10.00	0.00	0		
ARI00005	MYS.A.002.18	10982	ARI00005 \$ 5 MD		ARIKPBOP.9100		10.00	0.00	0		
ARI00006	MYS.A.002.04	10976	ARI00006 # 25		ARIKPBOP.9100		10.00	0.00	0		
ARI00007	MYS.A.002.09	10971	ARI00007 # 100		ARIKPBOP.9100		10.00	0.00	0		
ARI00008	MYS.A.002.10	10970	ARI00008 # 5		ARIKPBOP.9100		10.00	0.00	0		
ARI00009	MYS.A.002.11	10969	ARI00009 # 25		ARIKPBOP.9100		10.00	0.00	0		

Audit	Slot	Index	Jackpot	Fills	Drop	Meters	Summary	Performance	Game Setup	Today	Monthly Performance	Layout
All	Casino	Room	Bank	Values								

Win		Record Currency		Counts	
Theo	Act	Coin In	Jackpot	Day Win	Jackpot
45	2	56	74	8	7
55	1	63	75	7	8
52	3	38	71	4	15
57	1	71	88	7	44
46	11	75	78	18	21
29	2	35	91	3	11
55	21	5	5	22	14
44	4	22	83	7	10
38	9	28	85	12	15
68	5	78	84	10	22
41	8	65	86	12	33
37	7	48	83	11	11
33	2	38	88	5	15
52	1	55	77	4	18
48	1	44	78	4	12
51	14	48	76	33	10
37	15	46	77	38	6
37	3	37	38	22	11
37	3	37	38	22	11

FIG. 6

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GAMIT
Visual
Analysis

Current Sort Order

Focus Location Coordinates

Machine Info		Machine History	
Location	MYS.A 053.08	Par %	7.200
Placard	10825	Model	Queen
Machine	ARI00262	Type	ARI2VQ
Revision	2000421	Added	
Denom	.05	OnBoard	1008.25

716

Placard	Manufacturer	Denom	Avg Daily Win	Total Win	Coin In
1853	IGT	.01	1.00	164,398.00	1,730,989
1854	IGT	.25	7.00	522,400.00	9,335,054
1857	ARI	.25	569.00	318,907.00	3,331,496

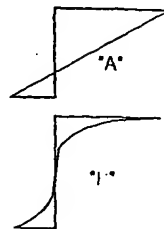
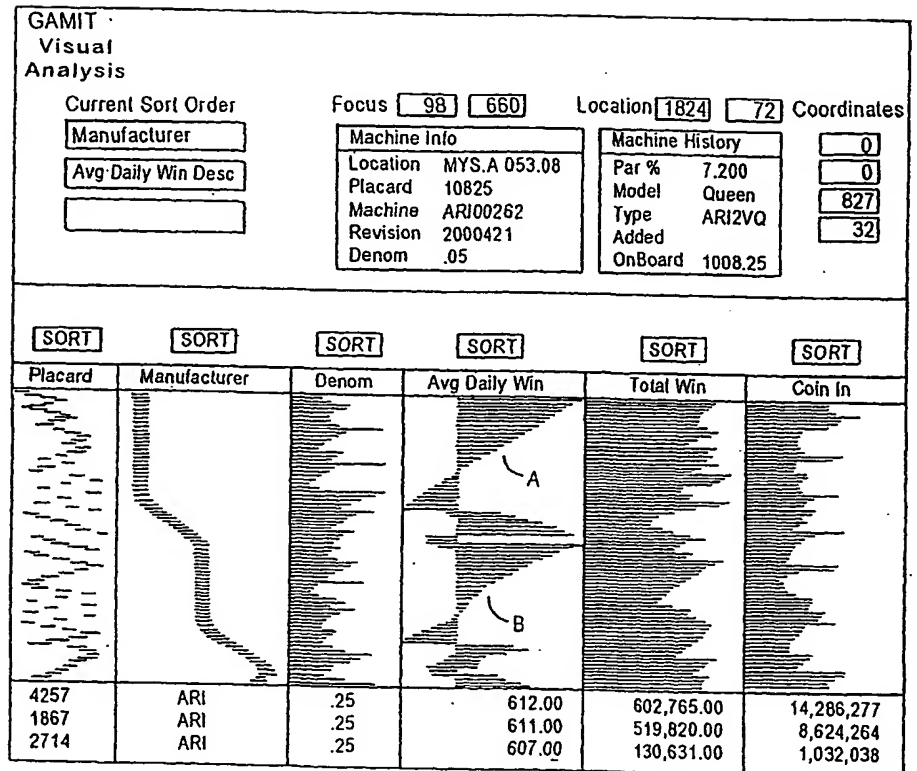
704 706 708 710 712 714

700

FIG. 7

SUBSTITUTE SHEET (RULE 26)

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SHOWS RELATIVE
WEAKNESS OF
WIN FROM "B"
MACHINES
VERSUS
"A" MACHINES

FIG. 8

SUBSTITUTE SHEET (RULE 26)

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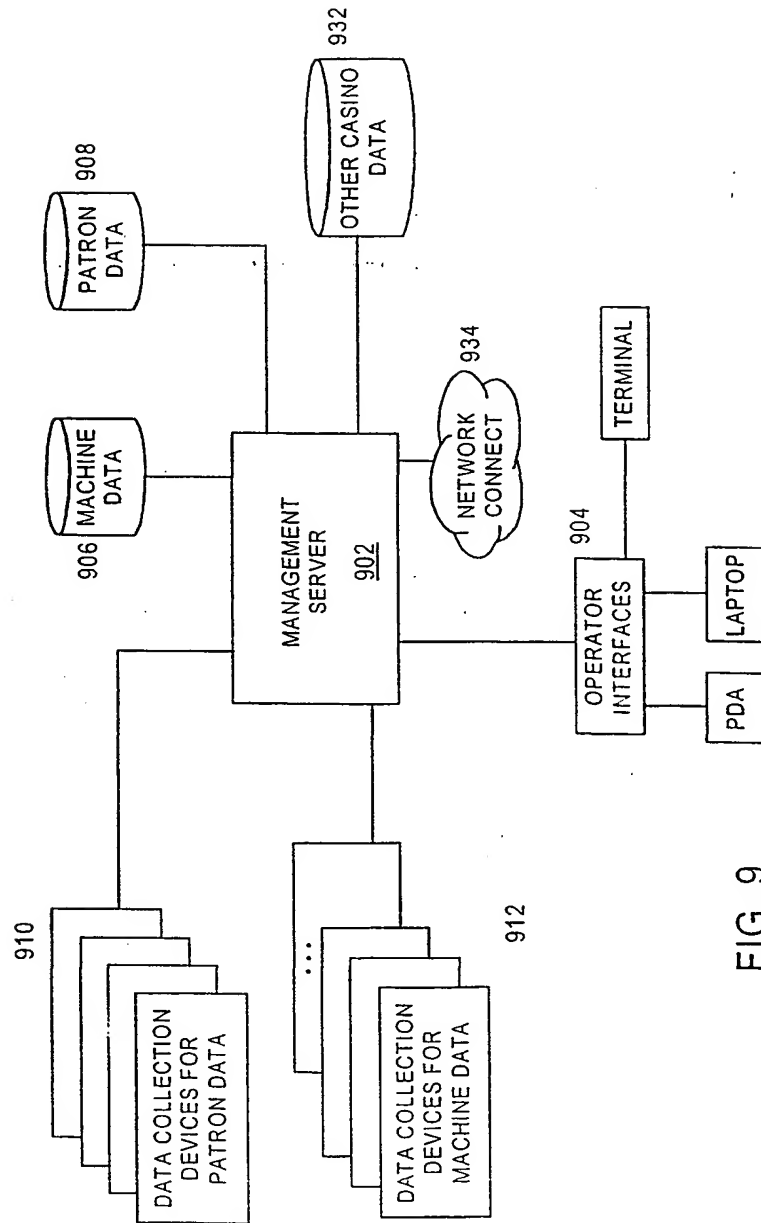


FIG. 9

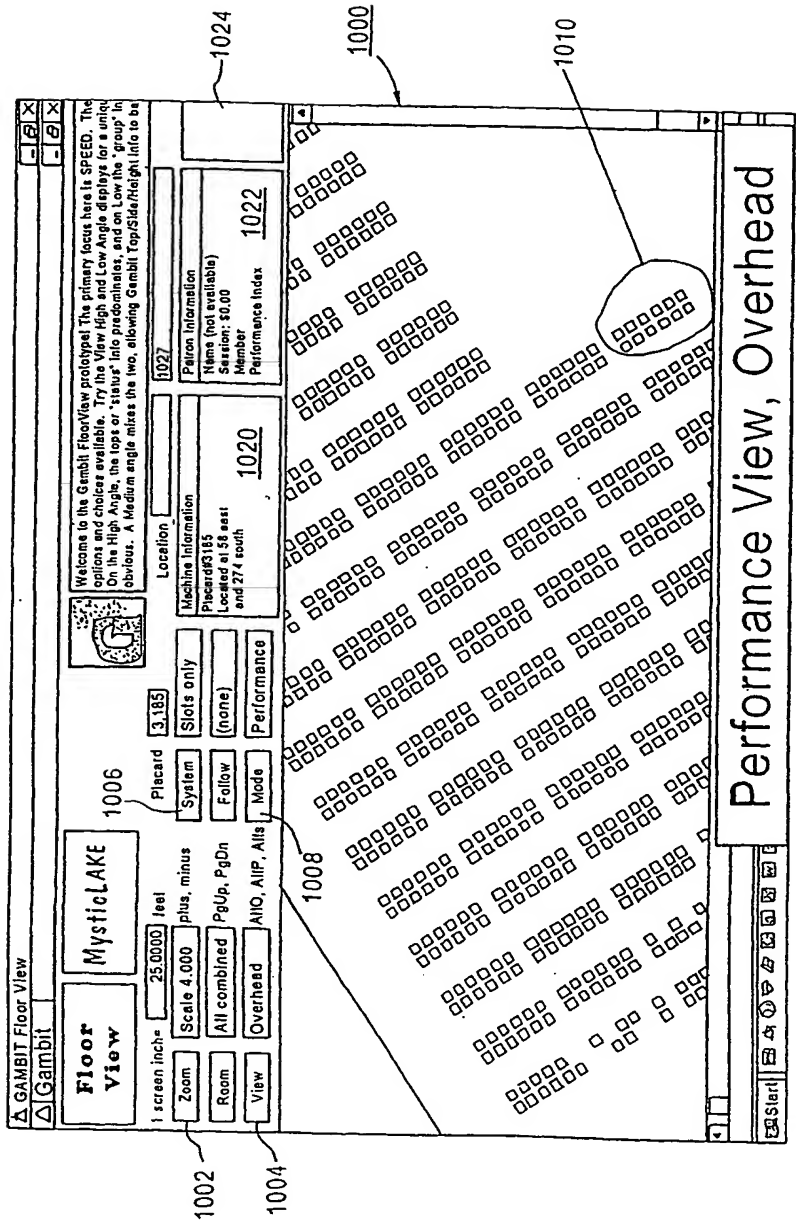


FIG. 10

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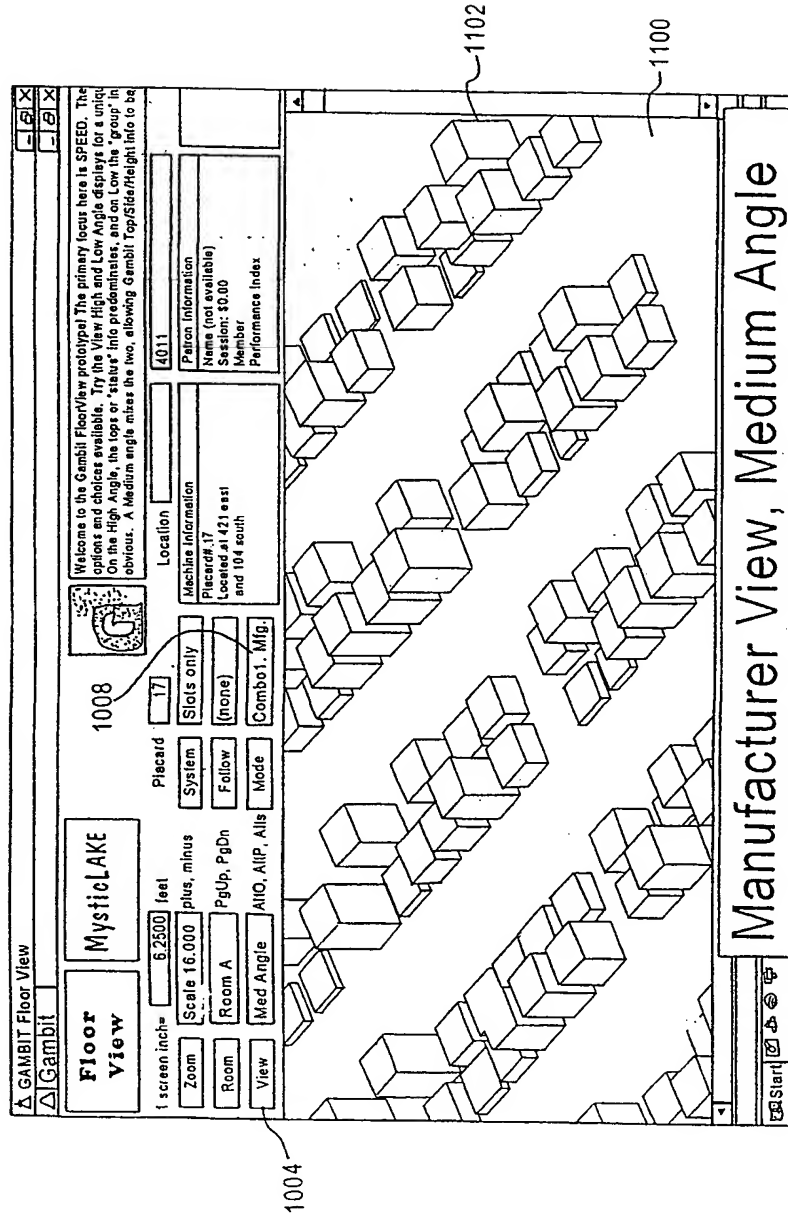


FIG. 11

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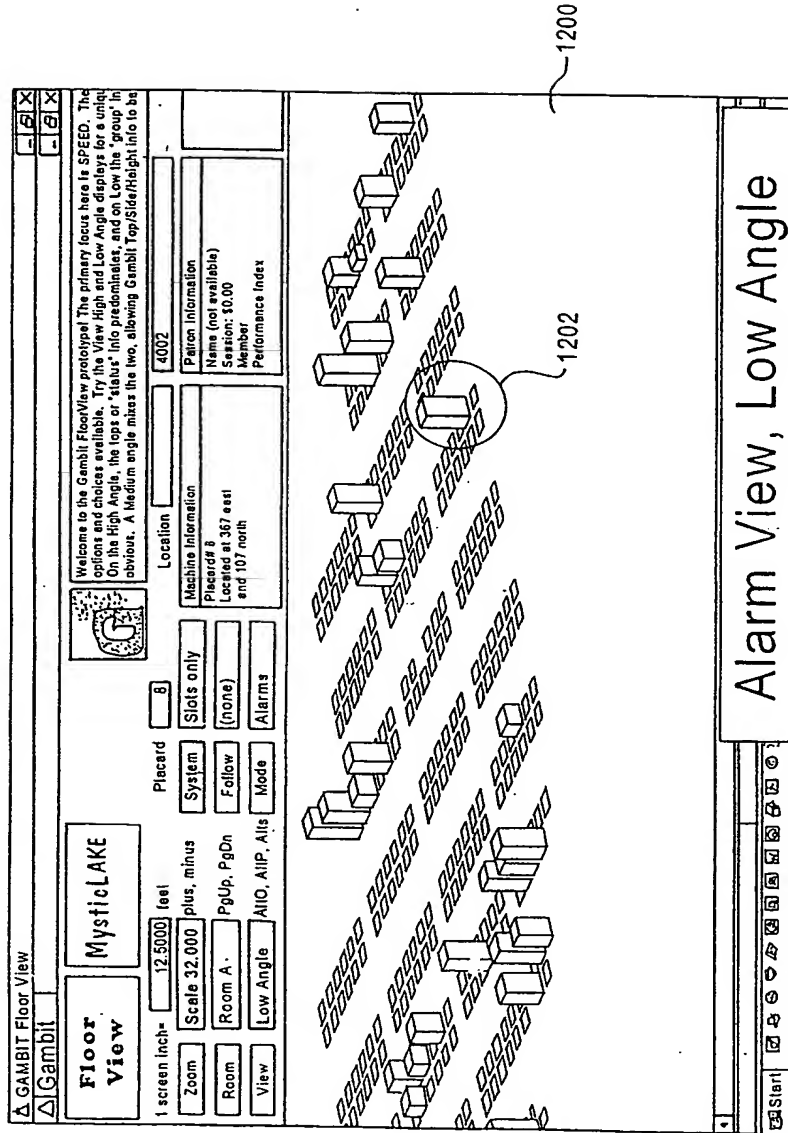


FIG. 12

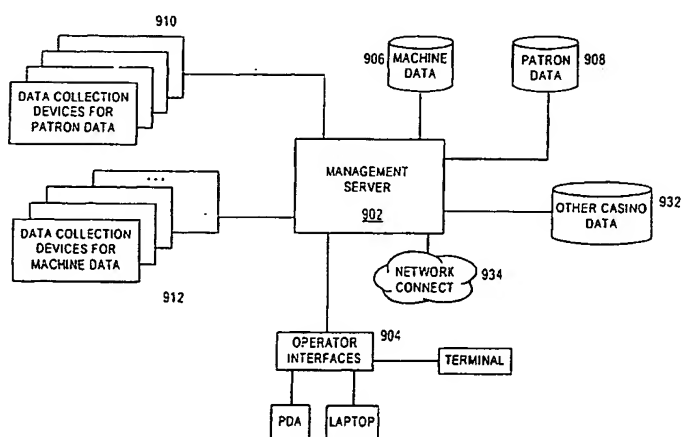
(19) World Intellectual Property Organization
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- (71) Applicant: GAMING SYSTEMS INTERNATIONAL
[US/US]; 2900 East Patrick Lane, Las Vegas, NV 89120-2458 (US).
- (72) Inventor: HOWINGTON, David, Keith; 916 Camino Concordia, Camarillo, CA 93010 (US).
- (74) Agent: OGONOWSKY, Brian, D.; Patent Law Group LLP, 2635 North First Street, Suite 223, San Jose, CA 95134-2049 (US).
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- Published:
— with international search report
- (88) Date of publication of the international search report:
6 March 2003
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SYSTEM AND METHOD FOR CASINO MANAGEMENT



(57) Abstract: A casino resort management system collects patron data (908), manages patron data in a high performance data warehouse, shares patron data with other systems and reports vital patron information. The system particularly tracks machine history (906), including changes in location, configuration and performance, and tracks the location history, including game type and denomination, and allows for placards to be moved from one gaming machine to another without losing historical machine or location information. In addition, the system provides two particularly useful graphical displays that simplify visual analysis of the large amounts of data within a casino. One display method depicts tables of thin bar graphs that compactly allow side-by-side comparison of different groupings of machines and another display method depicts machines in three dimensions so that each dimension can provide visual information to a server.

WO 02/032517 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/32337

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/60

US CL : 705/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/14, 28; 273/138.1; 463/16, 29, 43

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
casino, manage, patron, customer, client, buyer, purchaser, incentive, patron adj card, gaming adj machine, track, monitor

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,E	US 2001/0031664 A1 (ACRES) 18 October 2001, see abstract, paragraphs 0010, 0016, 0192, 0195, 0326, 0327, 0338-0348.	1-15, 37-43
A,E	US 2001/0048374 A1 (BLAD) 06 December 2001, see abstract, paragraphs 0010, 0022-0024, 0037, 0038.	7-36
X,E	US 2002/002075 A1 (ROWE) 03 January 2002, see abstract, paragraphs 0011-0012.	1, 3, 37-43
X,E	US 2002/0034299 A1 (CHARRIN) 21 March 2002, see abstract, paragraphs 0013, 0014, 0039, 0040.	1-6, 37-43
X,E	US 2002/0042300 A2 (ACRES) 11 April 2002, see abstract, paragraphs 0010, 0104, 0106, 0107, 0354-0356.	1-15, 37-43
X	US 5,655,961 A (ACRES et al.) 12 August 1997, see abstract, col. 1, lines 1-13; col. 2, lines 46-53; col. 3, lines 13-16; col. 6, lines 61-67; col. 13, lines 49-63.	1-43
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Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

19 April 2002 (19.04.2002)

Date of mailing of the international search report

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19 SEP 2002

INTERNATIONAL SEARCH REPORT

PCT/US01/32337

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,909,486 A (WALKER et al.) 01 June 1999, see abstract, col. 1, lines 6-12; col. 2, lines 16-21; col. 4, lines 44-60.	1, 3, 37-43
X,P	US 6,162,122 A (ACRES et al.) 19 December 2000, see abstract, col. 1, lines 12-21; col. 2, lines 53-62; col. 7, lines 1-8; col. 13, lines 63-67; col. 14, lines 1-10.	1-43
X,P	US 6,229,879 B1 (WALKER et al.) 08 May 2001, see abstract, col. 1, lines 9-15; col. 2, lines 17-23; col. 4, lines 53-67.	1, 3, 37-43
X,P	US 6,244,958 B1 (ACRES) 12 June 2001, see abstract, col. 1, lines 13-36; col. 2, lines 25-30; col. 5, lines 44-53.	1-15, 37-43
X,P	US 6,257,981 B1 (ACRES et al.) 10 July 2001, see abstract, col. 1, lines 35-50; col. 3, lines 20-24; col. 7, lines 2-6; col. 14, lines 24-47.	1-43
X,E	US 6,327,351 B1 (WALKER et al.) 04 December 2001, see abstract col. 1, lines 9-15; col. 2, lines 17-34; col. 4, lines 52-55.	1, 3, 37-43
X,E	US 6,368,215 B1 (WALKER et al.) 09 April 2002, see abstract, col. 1, lines 9-15; col. 2, lines 17-34; col. 4, lines 52-55.	1, 3, 37-43

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